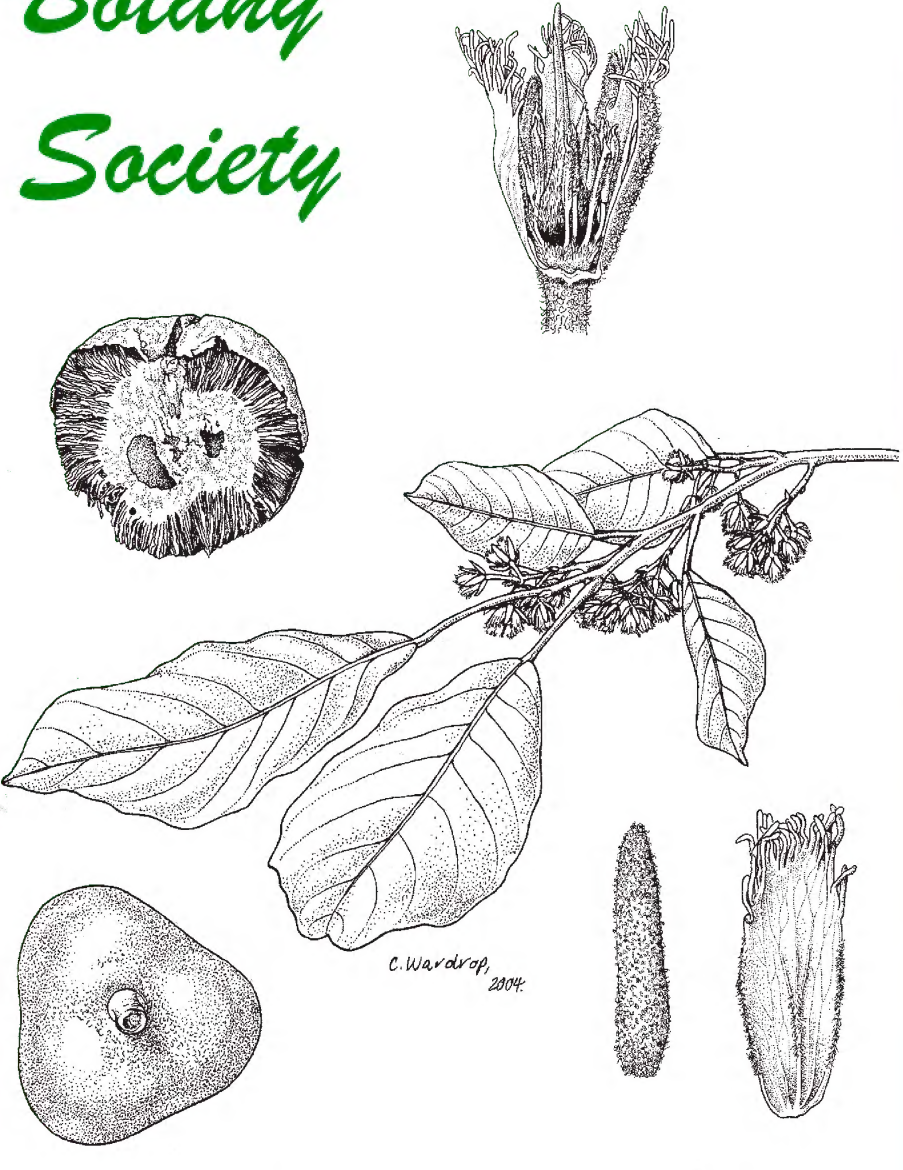
ASBS

Australasian Systematic Botany Society


C. Wardrop, 2004.

Newsletter

No. 172 September 2017

Price: $5.00

ISSN 2204-910X

AUSTRALASIAN SYSTEMATIC BOTANY SOCIETY INCORPORATED

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Cover image: *Elaeocarpus sedentarius* Maynard & Crayn. Leafy twig with clockwise from top: open flower, petal, sepal, proximal end of fruit, longitudinally sectioned fruit. *Artist*: Catherine Wardrop (NSW). *With permission of* CSIRO Publishing.

Publication dates of previous issue
Australas. Syst. Bot. Soc. Newslett. 171 (Jun 2017)
ASBS Web site: 8 Aug 2017. Printed version: 18 Aug 2017.

From the President

Council positions

In response to the recent call for nominations for ASBS Council positions, the secretary received one nomination for each of President, Vice President, Treasurer, and Secretary. For the two Councillor positions, however, nominations (three) exceeded vacancies. Electronic voting is now underway. This is the first time such a method has been used and Jen Tate (Secretary and returning officer) has done an excellent job running the electronic ballot, given there is no precedent to guide her! We can confirm that there are no clauses in the ASBS rules that prohibit dual nationals from holding office, so we don't expect any High Court challenges (in either country) to the legitimacy of the outcome. You can, and should, vote with confidence.

Elections for Council positions are rare. Not only is this the first time an electronic ballot has been used, to my knowledge there has only been one previous Council election, in 2008. While they generate a bit of work for the Secretary, elections are a sign of healthy interest by the membership in contributing to the Society. With respect to the current election, I am especially pleased to see nominations of such high quality that span latitudinally the Society's geographical footprint: from Perth (Ryonen Butcher) to Sydney (Hervé Sauquet) and across the ditch to Wellington (Heidi Meudt). It is also encouraging to see strong female representation – as reported in my previous President's report (no. 171) women have been under-represented on Council relative to the underlying membership. Since 1973, 25% of Council positions have been occupied by females (currently there are 33%) and the membership is currently c. 41% female (historical figures not known). The incoming Council will include two (of 6, 33%) or three (50%) females depending on the outcome of voting for the two Councillor positions. Whatever the result, I am sure it will be known a bit more quickly than the recent New Zealand parliamentary election.

ASBS-SASB 2017 conference

Registration and abstract submission are now closed and we are counting down to the start of the conference. Meeting with our 'sister' society, the Society of Australian Systematic Biologists (SASB), is a rare pleasure. The last such meeting – Sydney 2010 – was a great success and I am sure Adelaide will be even better. Make sure you regularly visit the conference website, *systematics.ourplants.org*, to keep abreast of developments.

As this will be the final President's report prior to the Adelaide conference, I'd like to remind members of a few things. The Society's Annual General Meeting will be held on Tuesday 28 November from 15:30 to 16:30 at the University of Adelaide; the room will be announced at the conference. This is one of the most important events on the Society's calendar, and the only real opportunity for those you have elected to govern the Society to engage face to face with a broad sample of the membership. I strongly encourage all members to attend and participate – Council certainly would welcome questions, queries and comments from the floor, or privately, on any relevant aspect of Society business. Additionally, there will be a plenary session on the Decadal Plan for Taxonomy and Systematics where an exposure draft of the Plan will be tabled. Much engagement with the community has taken place already, principally through the 'town hall' meetings, but it is hoped that with the release of the draft Plan this engagement will become more targeted. In many ways, this Plan is our best chance for systemic change to secure the future of our discipline and it behoves all of us to contribute meaningfully to its development and implementation. Checking in regularly with the *noto|biotica* blog at *notobiotica.posthaven.com* is a useful way to keep up to date with the development of ideas. For more information and detail see the full report by Kevin Thiele in this newsletter (p. 9).

On behalf of Council, we are very much looking forward to the Adelaide conference and the chance to reconnect with old friends and make new ones. Please, I implore you – if you haven't met a member of your governance team, do introduce yourself at the conference. We would love to meet you and hear what the Society means to you and how it can better serve you now and in the future. Often, these conversations are easier to have one-on-one than in plenary at an AGM.

Darren Crayn

ASBS Inc. business

Election for Council closing 13th November

The call for Council members this year resulted in three members nominating for two available Councillor positions for 2017-2018. The membership is now invited to vote for two Councillors to fill these positions for the coming year. You have the option to vote online, in which case, each member will receive an email directing you to the voting site, or by paper ballot. The latter is attached to this email and can be returned to the secretary at the address on the ballot. The final votes must be received by the Secretary no later than 13 November 2017. All votes will remain confidential and known only to the Secretary for counting purposes.

Biographies for the three nominees

Ms Ryonen Butcher

I am a Research Scientist at the Western Australian Herbarium (PERTH) currently employed through a three year ABRS grant (NTRGP 2017–2020) to conduct collaborative alpha taxonomic research on the large legume genus *Tephrosia* (Fabaceae: Millettieae) in Western Australia and the Northern Territory. This project aims to describe the c. 40 known informally-named taxa, revise the c. 50 named taxa and resolve problematic taxon boundaries in *T. rosea*, produce an eFlora treatment of the genus for WA and the NT, and a key for the genus Australia-wide. My previous research has concentrated on the biodiverse flora of the South Western Australian Floristic Region, where I have developed specialist knowledge in Elaeocarpaceae (*Tetratheca*, *Platytheca*, *Tremandra*), Proteaceae (*Synaphea*) and Fabaceae (*Sphaerolobium*, *Mirbelia*). I am a currently serving ASBS councillor (2016–2017) and a proud advocate of gender equality in science.

Dr Heidi Meudt

I received my PhD from the University of Texas at Austin, USA in 2004, and was subsequently a postdoctoral fellow at Massey University, Palmerston North, New Zealand. Since 2006 I have been a Research Scientist (Botany) at the Museum of New Zealand Te Papa Tongarewa in Wellington, New Zealand, where I use statistical analyses of morphological and molecular data in an integrative systematics framework to study the taxonomy, phylogeny, classification and species limits of native New Zealand flowering plants. My specific taxonomic focus is New Zealand Plantaginaceae and Boraginaceae and their relatives in the Southern Hemisphere. From 2012 to 2014 I was an Alexander von Humboldt Experienced Researcher at the University of Oldenburg, Germany; I am also a Fellow of the Linnean Society. I am keen to be more involved in ASBS as Councillor and strengthen trans-Tasman ties within the society.

Dr Hervé Sauquet

I am an evolutionary biologist and systematic botanist with a broad interest in macroevolution. A key focus of my research is to unravel and better understand large-scale patterns in the evolution of flowers, combining molecular phylogenies and databases of plant morphology. I obtained my PhD in 2003 in Paris, worked as a postdoc in Stockholm, Sydney, and Kew, then as an Associate Professor at Université Paris-Sud from 2009 to 2017. I just moved to a new position at the Royal Botanic Gardens and Domains Trust in Sydney and am eager to get involved with the Australian botanical community and serve ASBS. I have been a member since 2006, am serving on the editorial boards of Scientific Reports and Taxon, and coordinated the production of a large MOOC on botany.

Website: *www.sauquetlab.org*.

Jen Tate
ASBS Secretary

Eichler Research Fund reports

New Zealand *Myosotis* (Boraginaceae)

Jessie Prebble
Allan Herbarium, Lincoln

New Zealand has over 40 native species of forget-me-nots (*Myosotis*; Boraginaceae), about two thirds of which are threatened or at risk. The genus is also in need of taxonomic revision, with numerous putative taxa identified.

In 2012 the Australasian Systematic Botany Society awarded me the Eichler grant to help fund forget-me-not field work in the northern South Island of New Zealand. This supported my PhD research into the population genetics and taxonomy of the pygmy forget-me-not group, which I completed last year (Prebble 2016). The grant helped me to travel to 18 locations over as many days during the 2012/2013 summer, from 2200 m a.s.l. on Mt Tapuae-o-Uenuku in the Kaikoura Ranges of Marlborough, to the botanically diverse Mt Arthur in the Kahurangi National Park (Fig. 1a, b), and down to sea-level at Farewell Spit in northwest Nelson (Fig. 2a). I had already completed field work in other parts of New Zealand, and these trips helped to fill in some important collection gaps.

Over the course of the Eichler funded field work I collected from 22 populations of 10 *Myosotis* species and putative taxa. The voucher specimens collected were lodged at WELT, while the leaves collected onto silica were ground up and their DNA extracted, then genotyped using microsatellite markers that I developed using next-generation sequencing (Prebble et al. 2015). Collected seeds were grown on in a common garden (Fig. 2b). Growing the plants revealed high levels of morphological plasticity, which has likely been contributing to the taxonomic difficulties in this group.

When I started working on the pygmy forget-me-nots, this group of morphologically-similar species consisted of five named species: *M. antarctica*, *M. brevis*, *M. drucei*, *M. glauca*, and

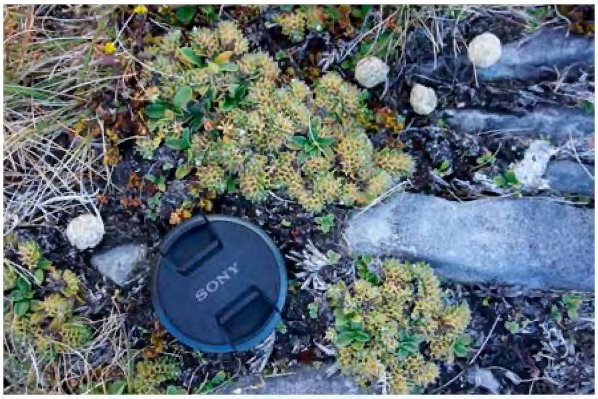


Fig. 1. a (top), pygmy *Myosotis*, Mt Arthur, ph. J. Prebble.
b, Jessie and Lesley Bagnall (Mum), Mt Arthur, ph. Mark Prebble (Dad);

Fig. 2, a (left), Jessie and Lesley, coastal North-west Nelson, ph. M. Prebble; b, Common garden, Day 1 Massey University, Palmerston North, ph. J. Prebble.

M. pygmaea. In addition, a number of putative taxa had been identified, with unclear affiliation to the pygmy forget-me-not group. The field trip up Mt Tapuae-o-Uenuku allowed for the collection of one such putative taxon for the first time since the 1980s (Fig. 3). The access to that site comprised an exciting day of walking up a river, staying in a tiny hut, followed by another day of scree scrambling, all in search of some rather lovely little plants.

The results of my thesis are in the process of being published as four separate papers, with one paper published (Prebble et al. 2015), one on the way (Prebble et al. under review at *Systematic Botany*), and others to be submitted soon. The population genetic dataset of over 500 genotyped individuals showed low within and high between genetic variation, which supports the idea that these species usually self-fertilise, as well as pointing towards low levels of dispersal. The final chapter in my thesis is an integrative taxonomic revision of the pygmy forget-me-nots, complete with ecological niche modelling, descriptions, a key, maps, and suggested conservation status updates. There is morphological and genetic evidence to continue recognising some but not all of the pygmy forget-me-nots at species level, but you'll have to wait for the publication to find out who makes the cut!

Myosotis brevis and *M. glauca* are the two most threatened pygmy forget-me-nots. We are particularly concerned about the North Island populations of *M. brevis*, which inhabit coastal turf ecosystems that are themselves threatened. Populations that were surveyed as recently as 2005 have been destroyed by goat browsing, and in some locations that we visited the cliff top turfs are eroding into the ocean. The field work over the course of my thesis has contributed to our knowledge of population size and persistence for all of the pygmy forget-me-nots, which has fed through to their threat status as managed by the Department of Conservation.

My thesis was able to resolve the status of some putative taxa, whereas others required comparison with additional species outside the pygmy group. Luckily (well OK, it may have been planned) Heidi Meudt was already working on the remainder of the bracteate-prostrate Southern Hemisphere *Myosotis*, and we were able to make those comparisons. For example, regarding the putative taxon from Mt Tapuae-o-Uenuku, we found that although it is easily distinguishable both morphologically and genetically from all of the pygmy forget-me-nots including one it grows in sympatry with, it is indistinguishable from a different species of New Zealand *Myosotis*. The details about this will be available soon in a journal near you (Meudt and Prebble, under review at *Australian Systematic Botany*).

Many thanks to the ASBS for supporting this research, and to all of the people who helped out with field work along the way (there were so many people!). I particularly want to thank my supervisors, who continued to encourage me the whole way through (Vaughan Symonds, Jen Tate and Heidi Meudt), and the Museum of New Zealand Te Papa Tongarewa who hosted me for much of my studies.

References

Prebble JM. 2016. Species delimitation and the population genetics of rare plants: a case study using the New Zealand native pygmy forget-me-not group (*Myosotis*; Boraginaceae). Unpublished PhD Thesis, Massey University, Palmerston North.

Prebble JM, Tate JA, Meudt HM, and Symonds, VV. 2015. Microsatellite markers for the New Zealand endemic *Myosotis pygmaea* species group (Boraginaceae) amplify across species. *Applications in Plant Sciences* 3(6)1500027. DOI: *http://dx.doi.org/10.3732/apps.1500027*

Prebble JM, Meudt HM, Tate JA, and Symonds, VV. Bolstering Species Delimitation in Difficult Species Complexes by Analyzing Herbarium and Common Garden Morphological Data: A Case Study using the New Zealand Native *Myosotis pygmaea* Species Group (Boraginaceae). Under review at *Systematic Botany*

Meudt, HM and Prebble JM. Species limits and taxonomic revision of the bracteate-prostrate group of Southern Hemisphere forget-me-nots (*Myosotis*, Boraginaceae) including description of three new species endemic to New Zealand. Under Review at *Australian Systematic Botany* .

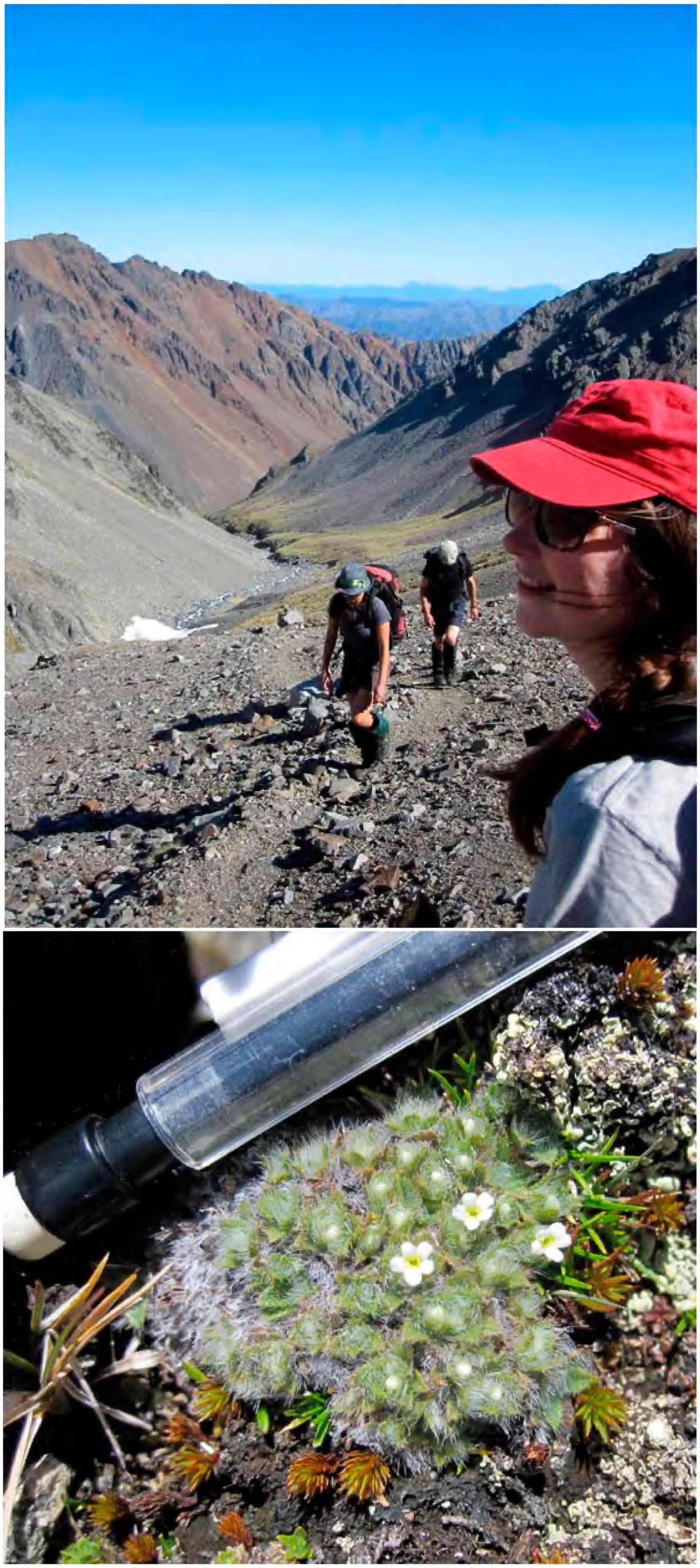


Fig. 3. From top: a, Jessie, Micheline Evans and Charlie Devonish on way up Mt Tapuae-o-Uenuku. ph. A. Packard; b, Putative *Myosotis* taxon, Mt Tapuae-o-Uenuku, ph. J. Prebble.

Using next-generation sequencing to explore diversity in the *Triodia basedowii* species complex

Benjamin Anderson (*banderson2914@gmail.com*)

Species complexes are, as their name suggests, difficult to sort out. The taxonomically frustrating fuzzy nature of relationships between closely-related species almost makes finding that new variant in the field a bit of an "oh no" moment. Just when we think we have found that set of characters that neatly distinguishes two species, we encounter the exception. While not a final solution to the challenge of delimiting evolutionary diversity, newer molecular approaches utilising next-generation sequencing (NGS) offer an additional tool for frustrated taxonomists to use in dissecting the complex relationships in species complexes.

During my PhD in Perth, I studied a species complex of perennial hummock grasses (*Triodia* R.Br.) with much of its diversity in Western Australia (WA) (Figs. 1, 2). These grasses (commonly called "spinifex") are widespread across Australia and prevalent in the arid interior, where they are often structurally dominant components of the vegetation and provide habitat and food for a variety of animals. The group I studied comprised unnamed species allied to *Triodia basedowii* E.Pritz. and *T. lanigera* Domin, with two already recognised with phrase names prior to the start of my work. Biological surveys and field identification, particularly in the Pilbara region of WA, repeatedly encountered difficulties applying the two existing names (*T. basedowii* and *T. lanigera*) to specimens, suggesting there was a need to look more closely at this group.

After field study and initial morphological and genetic work (published in Anderson et al. 2016), it was becoming clear that there were more than two or three species in the group. Based on this more traditional approach, there was evidence for multiple entities in the Pilbara that were strongly demarcated geographically, but the initial dataset showed signs of conflict between markers and between morphology and molecular signals, as well as indications of hybridisation. To better sort out relationships between the putative taxa and to get a sense of genomic divergence between them, my supervisors and I decided to explore an NGS approach called genotyping-by-sequencing (GBS; Elshire et al. 2011, Grabowski et al.

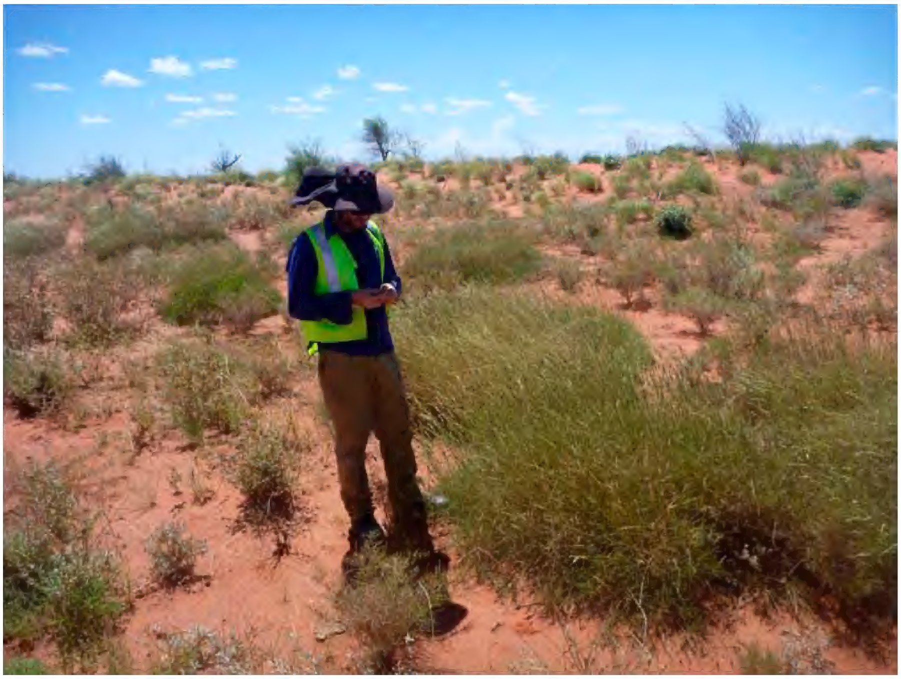


Fig. 1. Ben examining *Triodia sp. Warrawagine*, soon to be described.
Ph. M. Barrett

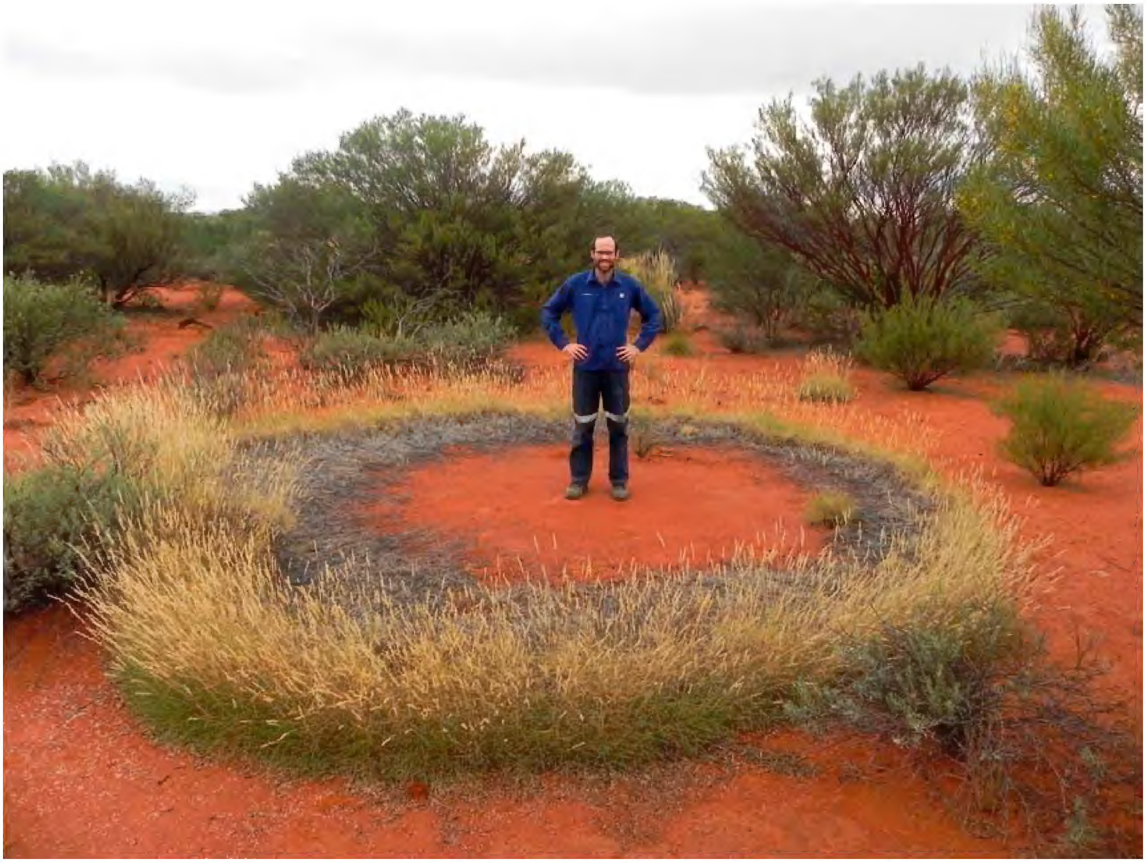


Fig. 2. Ben in a ring of *Triodia basedowii*. Ph. K. Thiele

2014).

In 2014, I received funding from the Hansjörg Eichler Scientific Research Fund to put toward the sequencing of additional samples. In total, 157 samples (more than 1.5 plates) were submitted for sequencing to the Australian National University Biomolecular Resource Facility, ~38 (one quarter) of which were possible because of the Eichler grant. Sequencing was completed by mid-2015, and then began a not-inconsequential period of analysis, which included learning how to use the bioinformatic tools necessary to properly analyse a dataset of that size. Of the 157 samples submitted, 136 were successfully sequenced to an adequate depth, resulting in roughly 4.5 million reads per sample. These were assembled into tens of thousands of loci per sample, from which I was able to create alignments and call variants for phylogenetic analyses and for assessing genomic divergence.

The primary GBS results with implications for the taxonomy of my group (published in Anderson et al. 2017a) broadly supported the distinction of most of the entities previously found using morphology and genetic markers, and provided a new estimation of relationships between those entities. The GBS results strengthened support for one species recognised by morphological but not genetic differences by showing a large amount of genomic divergence from its close relative. The results also helped to support the distinction of a new species discovered after the earlier traditional work had been completed. I presented some of the implications of the GBS results for relationships in the complex as well as for analytical approaches to NGS datasets at the 2015 ASBS annual conference in Canberra.

One of the important benefits of integrating multiple lines of evidence (morphological, genetic, genomic) in systematic work on complex groups is that these different perspectives on evolutionary divergence provide for better insight into the processes and history that have shaped current diversity. One of the outcomes from the GBS work has been to shed light on the demographic history of *Triodia basedowii* (hopefully published soon), with evidence for a recent range expansion from central Australia (surprisingly not from the Pilbara, where most of the diversity in the group is) probably concurrent with the expansion of sandy deserts in the last one million years. The integration of multiple lines of evidence also makes the taxonomic output more robust, and part of the output from this genomic work is support for the recognition of eight new species of *Triodia* (soon to be published: Anderson et al. 2017b).

Support from the Hansjörg Eichler Scientific Research Fund substantially improved the outcomes from the GBS work I undertook, which became a key component in my PhD and has broadened my experience in NGS techniques and analyses. I am grateful for the support of the society through this funding scheme and for the support I received at the ASBS conferences I attended throughout my time in Australia.

References

Anderson BM, Barrett MD, Krauss SL, Thiele KR (2016) Untangling a species complex of arid zone grasses (*Triodia*) reveals patterns congruent with co-occurring animals. *Molecular Phylogenetics and Evolution* 101, 142–162.

Anderson BM, Thiele KR, Krauss SL, Barrett MD (2017a) Genotyping-by-Sequencing in a Species Complex of Australian Hummock Grasses (*Triodia*): Methodological Insights and Phylogenetic Resolution. *PLoS ONE* 12, e0171053.

Anderson BM, Thiele KR, Barrett MD (2017b) A revision of the *Triodia basedowii* species complex and close relatives (Poaceae: Chloridoideae). *Australian Systematic Botany* (in press).

Elshire RJ, Glaubitz JC, Sun Q, Poland JA, Kawamoto K, Buckler ES, Mitchell SE (2011) A robust, simple genotyping-by-sequencing (GBS) approach for high diversity species. *PLoS ONE* 6, e19379.

Grabowski PP, Morris GP, Casler MD, Borevitz JO (2014) Population genomic variation reveals roles of history, adaptation and ploidy in switchgrass. *Molecular Ecology* 23, 4059–4073.

A postscript

Current Lucid keys

***Triodia* of the Pilbara** – *SpiKey*

Ben Anderson has also been involved in the development of a new app for identifying *Triodia* species from Western Australia's Pilbara region. Known as *SpiKey*, the guide covers 28 species and one hybrid (about a quarter of the species in *Triodia*), and includes many newly recognised species. It is available free of charge as a web version (Web ref. 1) and in mobile format for Android and iOS through the App Store.

SpiKey is co-authored by Matt Barrett (Kings Park Science), Ben Anderson (recent PhD graduate of The University of Western Australia) and Kevin Thiele (UWA). [adapted from Western Australian Herbarium Facebook page at Web ref. 2).

Accessing available Lucid keys – a global resource

If you haven't visited the Lucid pages (Web ref. 3) recently you will probably be surprised at the number of keys available, many of them for commercial purposes overseas (e.g. Web ref. 4 and covering the whole gamut of biodiversity. Unfortunately we were too late to advertise the recent Canberra workshop but note that Lucid 3.3 is presently being offered free of charge through the Lucid website and that there are new releases in Lucid 3.6 and Fact Sheet Fusion 2.

Web references

1. *http://keys.lucidcentral.org/keys/v3/triodia/*
2. *https://www.facebook.com/WesternAustralianHerbarium/photos/pb.254289827948229.-2207520000.1497741283./1427850067258860/?type=3*
3. *http://keys.lucidcentral.org*
4. *www.idtools.org/identify.php*

Robyn Barker

Current affairs in systematics

The Decadal Plan for Taxonomy and Biosystematics in Australasia

Kevin Thiele
Program Manager, Biosystematics and Taxonomy Plan
Australian Academy of Science

Significant progress has been made towards the development of a decadal plan for taxonomy and biosystematics in Australasia since the last ASBS Newsletter, and particularly since we were successful in our funding bid to the Ian Potter Foundation. In brief:

The Taxonomy 2028 Challenge (launched in this Newsletter in July) has been completed, with 20 contributions to the *noto|biotica* blog at *http://notobiotica.posthaven.com/*, mostly from early career researchers and students (if you haven't already done so, these are well worth reading, along with the other decadal plan contributions on the site). The perspectives, ideas and visions contributed through the Challenge have been very helpful to the project's Working Group in formulating our strategic vision for the decade.

The project's Working Group, now comprising 36 members, has met fortnightly since June, an heroic collective effort that has ensured good representation and wisdom from across the biotic spectrum of our community. The addition of the most recent member, Prof. Phil Hugenholtz (nominated by the Australian Society for Microbiology) has finally given us expertise in the prokaryotes, a group that has not been well represented till now.

The project's Advisory Committee has met for the first time and has begun planning for the implementation and advocacy phase of the project, which will commence in the lead-up to, and following, the release of the plan in early 2018. The Advisory Committee comprises Dr Judy West, Department of the Environment and Energy (Chair), Prof. Craig Moritz, Centre for Biodiversity Analysis, ANU, Prof. Pauline Ladiges, Academy of Science and The University of Melbourne, Dr Tom Trnski, Auckland War Memorial Museum, and Dr Wendy Nelson, NZ National Institute of Water and Atmosphere.

A "town hall" style meeting has been held in every capital in Australia (with video links for participants in Alice Springs, Cairns and Townsville). These meetings were collectively attended by approx. 330 people from across the sector and from key stakeholder groups. Break-out discussions at these meetings contributed a vast array of visions, issues, ideas and perspectives, which together comprise a key resource in formulating a proposed consensus vision for our community. As one would expect, common themes quickly emerged from these meetings; but each also threw up important new ideas. The prize for most novel idea has got to go to the Darwin meeting, with the suggestion that in the next decade the taxonomy and systematics community in Australasia should prepare for the discovery of alien life on new planets (or was it alien life visiting our planet – I can't remember). A key detail of exactly how we should prepare was omitted; the Working Group will need to consider this.

Next steps are a series of "town hall" meetings in Christchurch, Auckland and Wellington to ensure that New Zealand perspectives are well-represented, then many, many further conversations while we wrap up the plan ready for discussion at the Adelaide ASBS/SASB meeting, and final release in the first quarter of 2018.

I need to say that I very much appreciate the enormous amount of both work and goodwill that has gone into this initiative, firstly over several years from members of the Working Group, then more recently by the expanded Working Group, the Academy and Royal Society Te Aparangi, and all participants at the town hall meetings and contributors to *noto|biotica*. I believe there is a shared sense in the community that we need to be more strategic if we are to meet our ultimate objective of increasing the profile, recognition, status and funding for our discipline. A shared vision has emerged from all the many interactions I've had with community members and with stakeholders; that vision will be clearly stated in the plan, and I believe will give us our best shot at a successful, productive and reinvigorating decade.

News

New Zealand Science Review

In 2016 a whole issue of the journal *New Zealand Science Review* (Web ref.), official journal of the New Zealand Association of Scientists, was dedicated to the state of New Zealand systematics. Papers in the issue were those presented at a one day symposium “Systematics and Biodiversity: Past, Present and Future” held in Wellington in April 2016 under the auspices of the National Institute of Water & Atmospheric Research. Heidi Meudt’s paper “Integrative, next-generation, collaborative vascular plant systematics in New Zealand” is one of a number of papers on the state of play of systematics within different organisms (e.g. fish, freshwater insects, bryozoans etc), together with a consideration of the national collections and databases, the changes in the science field, and addressing whether there really is a taxonomic crisis.

The entire issue can be downloaded free as a pdf from Web ref. 1 and is relevant to the Australasian review presently taking place. There are issues of relevance in other volumes of the journal, too. So have a look at the home page of the journal to access these.

Web ref. *http://scientists.org.nz/files/journal/2016-73/NZSR73(3-4).pdf*

NZ Loder Cup to Peter de Lange

Congratulations to Peter de Lange, recipient of the 2017 Loder Cup (Web ref. 1), awarded to individuals and groups who make a significant contribution to plant conservation work in New Zealand. An image of Peter with the impressive cup can be seen at Web ref. 2. Peter is in some great company when you look at past recipients of this award, first instituted in 1929.

Web ref. 1. *www.doc.govt.nz/news/events/awards/loder-cup-award/*

Web ref. 2. *www.doc.govt.nz/news/events/awards/loder-cup-award/2017-winner/*

Coincidentally there has just appeared in my email box the announcement of the NZ Arboricultural Association Ronald Flook Award to Helen Lowe of Christchurch. I’m not aware that this lady has anything to do with our field but last year she managed to ensure protection for 1500 heritage and notable trees in Christchurch, a significant retention indeed for this post-earth-quake garden city.

Careers advice for junior scientists

The Editorial in the 25th October 2017 issue of *Nature* (Web ref. 1) would be rather dispiriting if you are an early career scientist but it is not really saying anything we are not all aware of – hence the Systematics workshops that many of you will have attended recently. However, as well as documenting some negative experiences, there are also some encouraging stories indicating that employment need not be confined to academia and there are some suggestions in the six articles in the same issue which might be helpful, particularly the one on Flexible working (Web ref. 2). Just hearing the stories of others may well help in making decisions about future directions (Web ref. 3), particularly when getting grants is based on old fashioned “publish or perish” ideas (Web ref. 4).

Web references

1. *https://www.nature.com/news/many-junior-scientists-need-to-take-a-hard-look-at-their-job-prospects-1.22879*
2. *www.nature.com/naturejobs/science/articles/10.1038/nj7676-419a*
3. *https://www.nature.com/news/young-talented-and-fed-up-scientists-tell-their-stories-1.20872*
4. *https://www.nature.com/news/let-researchers-try-new-paths-1.20857*

Fresh Science for early career researchers

Fresh Science is a national competition helping early-career researchers find, and then share, their stories of discovery. The program takes up-and-coming researchers with no media experience and turns them into spokespeople for science, giving them a taste of life in the limelight, with a day of media training and a public event in their home state. [From the website].

There are not too many systematic projects included here if you look at the stories on the website so far and unfortunately it is too late for this year since most events are being held about now. Nor is there any information presently available on their website for 2018 but don’t let that stop you finding an angle for your research and being ready to present it and promote your abilities next year.

Web ref. *http://freshscience.org.au/*

Australian Systematic Botany Student Prize

Congratulations to Elizabeth Sheedy who has been awarded the 2016 *Australian Systematic Botany* annual Student Prize for the best student-authored paper published in the journal. Elizabeth was the lead author in the paper, Sheedy et al., 2016, which is Open Access.

Her interests are broadly in the evolution and ecology of mushrooms, predominately at the level of species and population variation. However, she was excited to look a bit deeper into the evolution of a particular fruit-body form during her PhD, which included working with well-respected mycologists from Australia, the USA and Sweden, and which culminated in a fascinating paper published in *Australian Systematic Botany.* She has since worked at the National Museum of Nature and Science in Japan on introduced populations of mushrooms, and is currently working for Marcroft Grains Pathology in Horsham, on fungal pathogens of canola crops.

Thanks to Dr Brietta Pike of CSIRO Publishing for providing this information.

Reference

Sheedy, E.M., Ryberg, M., Lebel, T., May,T.W., Bougher, N.L. & Matheny, P.B. 2016). Dating the emergence of truffle-like fungi in Australia, by using an augmented meta-analysis. *Australian Systematic Botany* 29(5): 284–302. *https://doi.org/10.1071/SB16025*

This year's Margaret Flockton awards

The new book on Margaret Flockton published in the last year (see p. 37) served as a reminder of the annual award in her name (Web ref. 1) for scientific botanical illustrations. This year all of the works had to be submitted digitally and instead of the original artwork, as in the past, high quality prints were exhibited. Winner of this year's competition was Lucy Smith from Kew with her illustration of a new species of climbing palm, *Calamus pintaudii* W.J.Baker & J.Dransf., for the Palms of New Guinea Project (Baker & Dransfield 2017). Second prize went to Esmee Winkel of Leiden, while two Highly Commended awards went to Juan Luis Castillo from Spain and one to Rogerio Lupo of Brazil. All of these works are available on the web site and some further background to this year's exhibition, including the information that the Castillo works had been created on a tablet, can be seen in an article in the *Australian Geographic* (Web ref. 2).

References

Baker, W.J. & Dransfield, J. (2017). More new rattans from New Guinea and the Solomon Islands (*Calamus*, Arecaceae). *Phytotaxa* 305(2): 61–86. *https://doi.org/10.11646/phytotaxa.305.2.1*

Web ref. 1. *https://www.rbgsyd.nsw.gov.au/Science-Conservation/Botanical-Illustration/The-Margaret-Flockton-Award*

Web ref. 2. *www.australiangeographic.com.au/news/2017/05/margaret-flockton-2017-digital-illustrations*

Expedition returns from sunken Zealandia

A team of scientists has completed a nine-week voyage to study the newly-recognised, submerged continent, Zealandia (Web ref.). The scientists from the International Ocean Discovery Program (IODP) drilled deep into the seabed at six sites in water depths of more than 1,250 meters. They collected 2,500 meters of sediment cores from layers that record how the geography, volcanism and climate of Zealandia have changed over the last 70 million years. Until now, the region has been sparsely surveyed and sampled.

Significant new fossil discoveries indicate that Zealandia was not always as deeply submerged as does the discovery of microscopic shells of organisms that lived in warm shallow seas, and of spores and pollen from land plants.

Web ref. *https://www.nsf.gov/news/news_summ.jsp?cntn_id=243192*

2017 Photomicrography Competition

Always fascinating, take a look at the entries and winners in this year's photomicrography competition.

Web ref. *www.nikonsmallworld.com/galleries/photo/2017-photomicrography-competition*

New Zealand elections and the Te Papa blog

With New Zealand in election mode, Leon Perrie tackled the topic of voting for the environment from the perspective of the museum for the Te Papa blog (Web ref.). Others tackled the topics of education, immigration, housing and the economy. Leon's article is nothing to do with politics but a very readable state of environment piece pointing out some hard facts but tempering with some positives. It will be interesting to see how the new government treats this important portfolio.

Web ref. *http://blog.tepapa.govt.nz/2017/09/19/election-2017-voting-for-the-environment/*

Unveiling of portrait of Pauline Ladiges

Mike Bayly posted the following on FaceBook on 4th September.

> Today we had a small celebration for the unveiling of a portrait of Prof. Pauline Ladiges, long-time head of the School of Botany (1992–2010) [at Melbourne University], eucalypt expert, inspirational teacher, and mentor to a generation of local plant systematists. The portrait by Tom Alberts (right) is hanging in the Turner Theatre in the Botany building (BioSciences 2) [Fig. 1]. Although officially "retired", Pauline remains very active in supporting the herbarium, the School of BioSciences, and in nation-wide educational programs through her role as Secretary for Education and Public Awareness of the Australian Academy of Science. A quick google will tell you more about Pauline and her impressive career.

A new checklist of NZ flora

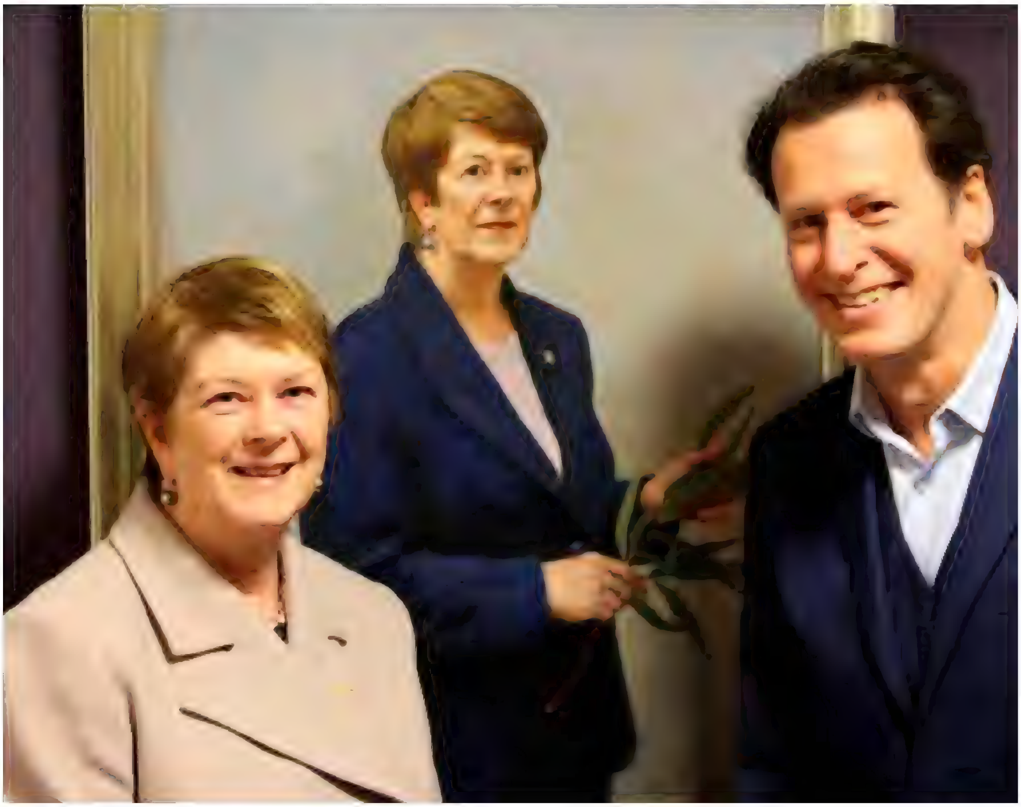
The latest of the rapid rate of publications on the New Zealand flora emanating from the Allan Herbarium is a new census of the country's flora, covering indigenous and naturalised seed plants.

> Taxa listed are those that are present in the wild flora in the New Zealand political region, including exotic cultivars. Hybrids are included only if one of the parental taxa is missing from the wild flora, or the hybrid is recorded as naturalised. Misapplications and tag names are excluded from the Checklist.

Reference

Schönberger I., Wilton A.D., Boardman K.F., Breitwieser I., Cochrane M., de Lange P.J., de Pauw B., Fife A.J., Ford K.A., Gibb E.S., Glenny D.S., Korver M.A., Novis P.M., Prebble J.M., Redmond D.N., Smissen R.D., Tawiri K. (2017) *Checklist of the New Zealand Flora – Seed Plants.* Lincoln, Manaaki Whenua-Landcare Research. *http://dx.doi.org/10.7931/P1D33B*

Fig. The Pauline Ladiges portrait at Melbourne University with subject and artist. Ph. M. Bayly



ABRS report

Staff updates

Zoe Knapp returned from maternity leave in September. Russell Barrett left in July to take up a position at the Royal Botanic Gardens and Domain Trust, Sydney. Chris Palmer, who replaced Zoe while on maternity leave, continues to work part-time assisting with data management in the Australian Faunal Directory. Glen Cook commenced in June as the new ABRS grants manager, replacing Eleanor Hearder. Tony Orchard continues to provide volunteer editorial support for the *Flora of Australia*.

An electronic *Flora of Australia*

The *Flora of Australia* (FoA) is now available online (Web ref. 1) on an interactive eFlora platform. Initiated as a collaborative project between the Council of Heads of Australian Herbaria, ABRS and the Atlas of Living Australia (ALA), successful delivery of an electronic FoA is the result of a momentous collaborative effort among taxonomists in Australia and New Zealand. The ABRS is grateful for the contributions of everyone involved in the project, particularly Kevin Thiele for his continued leadership and support and Russell Barrett for his work on manuscripts.

The electronic FoA was informally launched at the International Botanical Congress in China in July 2017, and the ABRS plans to hold a formal launch at the upcoming Systematics Conference in Adelaide in November. The ALA will address some outstanding functionality issues and bug fixes prior to the formal launch.

Approximately 14 000 taxon profiles are now available, including treatments previously published in the hard copy series, with nomenclatural updates to be made progressively. Nearly 500 taxon profiles new to the FoA have been added in draft form (not publicly accessible) and will be progressively published. These include parts of Amaranthaceae, Euphorbiaceae, Hypericaceae, and Scrophulariaceae. Taxon profiles were developed from treatments previously provided to the ABRS for publication in planned, but unpublished, FoA volumes. The ABRS is currently developing contributor guidelines and user support is available online (Web ref. 2). The ABRS welcomes any feedback on the electronic FoA, including the content, platform functionality and suggestions that may inform development of contributor or user guidelines and support.

Priorities for new contributions of vascular plant taxa to the FoA are outlined on the ABRS website (Web ref. 5, and refer to 'Grants' section below).

Fungi of Australia

The new volume covering Australian Inocybaceae (P. Brandon Matheny, Neale L. Bougher) has been published and is available from CSIRO Publishing (Web ref. 3).

Grants (unfortunately now closed)[1]

The 2018–19 National Taxonomy Research Grant Programme (NTRGP) Research Grants and Capacity-Building Grants rounds are now open. Applications close 2pm (AEDT) on Thursday 2 November 2017. More information is available on the ABRS website (Web ref. 4).

Please note that for the 2018-19 NTRGP grants round, funding for vascular plant groups will be prioritised towards taxa listed in the Final Priority Plant Taxa List for projects relating to the *Flora of Australia* (Web ref. 4).

The Bush Blitz Tactical Taxonomy grants are currently open and close on 16 October. More information is available on the Bush Blitz website (Web ref. 5).

Bush Blitz

Bush Blitz has completed 3 expeditions in the last 6 months, to the Bradshaw Military Training Area in the NT, Lake Mungo National Park in NSW and the Great Victoria Desert in SA.

Web references

1. *www.ausflora.org.au*
2. *https://ausflora.net/*
3. *www.publish.csiro.au/book/7650/*
4. *www.environment.gov.au/science/abrs/grants/*
5. *www.bushblitz.org.au/grants*

Zoe Knapp & Anthony Whalen

ABRS, September 2017

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[1] We apologise that the Newsletter was not published before these closing dates. Eds

Another postscript

Global online Floras

Further to the on-line *Flora of Australia* the following sites show two global electronic floras which are in their early stages.

Plants of the World Online (POWO)

On 3 April 2017, the Royal Botanic Gardens, Kew, in London launched Plants of the World Online (Web ref. 1), a project that it hopes will include information on all the world's known seed-bearing plants by 2020.

This e-resource will be a single point of access for authoritative information on plant species, from anywhere in the world. It will provide a multi-dimensional catalogue of plant life, including information on identification, distribution, traits, threat status, molecular phylogenies and uses. It will use Kew's extensive data resources alongside images from the digitisation of the collections.

This one-stop portal will enable dissemination of plant information at levels accessible to all. The UK flora is extremely well known, and POWO will consolidate the wealth of information on UK species in a dedicated UK portal. In addition, we will start to build a similar online repository for UK fungal collections and will provide the knowledge and support for partners in other countries to set up their own portals, which can be linked through to Kew.

This will ultimately lead to a resource that has global coverage, linking directly through to the taxonomic framework provided by the World Flora Online (Web ref. 2), which aims to provide an online taxonomic resource for all known plants. [Adapted from website.]

World Flora Online (WFO)

This is a related project run by an international consortium which aims eventually to create a full inventory of all plant life (Web ref. 2). Australia is represented through ABRS.

In 2010, the updated Global Strategy for Plant Conservation (GSPC) of the U.N. Convention on Biological Diversity included as its first target the need for "An online flora of all known plants." In January 2012 representatives from the Missouri, the New York, the Edinburgh and the Kew Botanic Gardens, took the initiative to meet and discuss how to achieve this target by 2020. The meeting resulted in a proposed outline of the scope and content of a World Flora Online, as well as a decision to form an international consortium of institutions and organizations to collaborate on providing that content.

The World Flora Online project was launched in India in October 2012. In January 2013 a Memorandum of Understanding on the World Flora Online, was opened for signature. By August 2014, 24 institutions and organizations had signed the MOU. A range of other institutions and organizations worldwide is also being invited to participate in the WFO Consortium.

The World Flora Online will be an open-access, Web-based compendium of the world's plant species. It will be a collaborative, international project, building upon existing knowledge and published floras, checklists and revisions but will also require the collection and generation of new information on poorly know plant groups and plants in unexplored regions. [Adapted from website]

Web references

1. *www.plantsoftheworldonline.org/*
2. *www.worldfloraonline.org/*

Robyn Barker
State Herbarium of South Australia

ASBS Council election

Cast your vote NOW!

See p. 2 for details.

Votes must be received by the
Secretary no later than 13 November 2017

Conference reports

XIX International Botanical Congress in Shenzhen, 17–29 July 2017

Karen Wilson
National Herbarium of NSW, Royal Botanic Gardens and Domain Trust, Sydney

Shenzhen adjoins Hong Kong and receives little more than a few sentences in guidebooks about its rapid growth from a cluster of rural villages in 1979 to a high-rise industrial city of more than 11 million people – some sources say as many as 18 million now live or work there on any day. It was developed as China's first Special Economic Zone and has one of the world's busiest container ports. Given what I had read, I was pleasantly surprised with what I found there during the IBC. Even the sky was blue (between storms) for the first week, although the air pollution built up until it was very high by the end of the fortnight.

The city is indeed big and buildings are mostly high-rise and modern (Fig. 1). It was rare to glimpse older buildings less than about 5 stories tall. However, in the areas I visited, most streets were lined with trees and under-planted with kerbside gardens, providing respite from the steamy heat as we walked to the IBC venues. People were friendly but spoke surprisingly little English for such an international centre. Everyone seemed happy to whip out their smart phones and use maps and translations to help. It was useful to have destinations written down when travelling anywhere.

The city administration and Chinese Academy of Science pulled out all stops to ensure the success of the IBC, ranging from a very high level of sponsorship to having about 1300 volunteers at all venues for the fortnight. These were mostly undergraduates (not necessarily studying botany) but the youngest we met was 15 and already super-keen on botany.

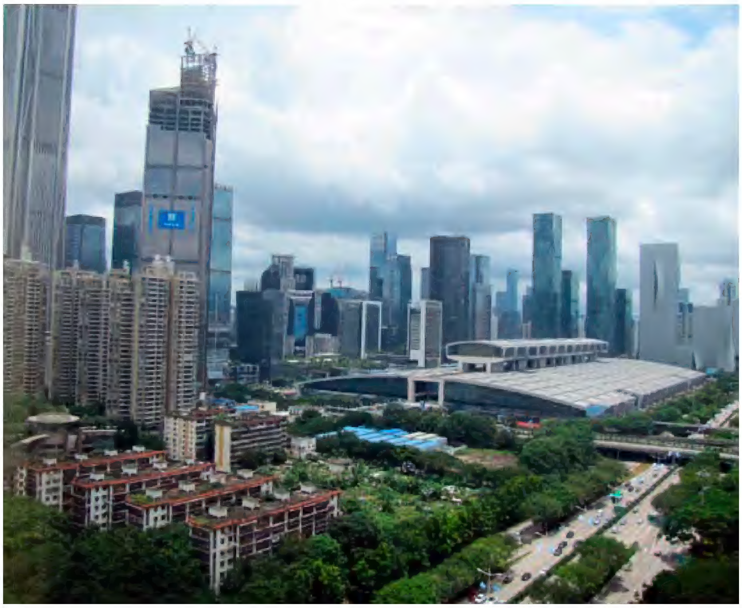


Fig. 1. The Convention and Exhibition Centre as seen from our hotel.
Ph. K. Wilson

The Congress registration fees were much lower than we could afford to charge for the previous IBC in Melbourne, and visitors did not have to contend with a high exchange rate such as we had in 2011. Delegates numbered nearly 7000, the largest number at any Congress so far, with about 2000 from other countries. Security was tight, and everyone had to go through a security check to enter the venues.

Nomenclature

The Nomenclature Section met on 17–21 July (8 a.m–6 p.m.) in the very modern Peking University HSBC Business School, part of the leafy Shenzhen University Town. Despite concerns beforehand about having to cater for very high numbers, in the end a manageable 155 turned up (Fig. 2).

The session was very busy, dealing with 397 proposals plus 16 from the floor - the largest number since the Stockholm Congress in 1950. As usual, the discussions were intense and complicated. Sandy Knapp ably chaired the

Fig. 2. Session participants with (front row) Bureau of Nomenclature members Anna Monro, John Wiersema, Nick Turland, Sandy Knapp and the six vice-presidents: Renée Fortunato, John McNeill, Werner Greuter, Gideon Smith and Karen Wilson. Ph. G. Shimizu.

meeting, with Nick Turland and John Wiersema providing expert nomenclatural guidance as Rapporteurs. Yun-fei Deng and Anna Monro recorded the proceedings (Figs. 2–4), with assistance from Li Zhang on some days. As in Melbourne, Anna had the difficult job of typing in changes to each article as they were suggested for projection on the screen.

See Knapp et al. (2017) and Turland et al. (2017) for more details about the Session and the changes made to the Code. There is a useful list of dates that limit particular rules in the latter reference (on p. 1238). The Shenzhen Code is being prepared by the Editorial Committee for publication in 2018, but note that the changes accepted in Shenzhen took effect from the final plenary session of the IBC on 29 July.

Fig.3, Kevin Thiele and Francis Nge at the Nomenclatural Session. Ph. G. Shimizu

Major decisions included:

1. Setting up a new Permanent Committee for Registration to examine ways to implement registration of plant and algal names (as already being done for fungi).
2. Moving articles affecting only fungal names to a separate chapter; these will be amended by the Fungal Nomenclature Session of the International Mycological Congress (held every four years; next IMC will be in Puerto Rico in 2018).
3. Expanding Division III about governance of the Code, making it easier for everyone to understand how changes are made to the Code and how the various Nomenclature Committees and Special Committees are set up and operate between Congresses.

The Nomenclature Committees for the next six years were appointed on the last day, including various people from our part of the world:

Tom May in the new position of Secretary of the Fungal Nomenclature Bureau for the 11th International Mycological Congress in 2018, also Secretary of the Nomenclature Committee for Fungi, ex officio member of the General Committee and member of the Code Editorial Committee;

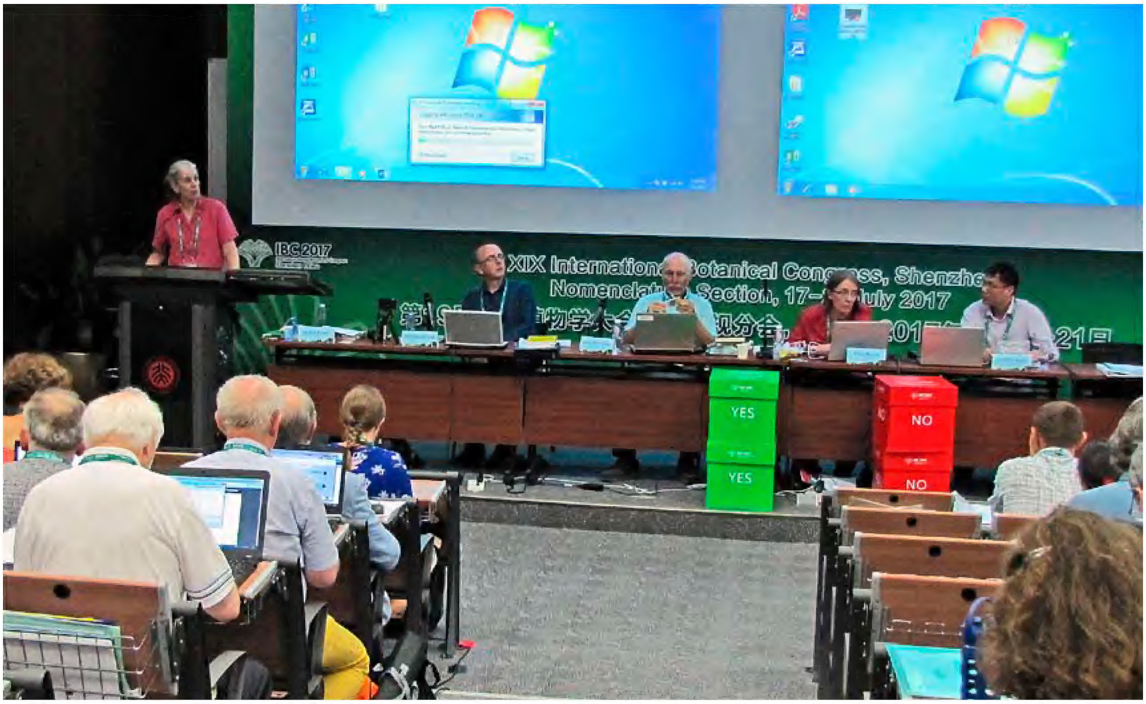

IBC2017
XIX International Botanical Congress, Shenzhen
Nomenclature Section, 17–21 July 2017
YES
NO
YES
NO

Fig. 4, from left to right: a, Sandy Knapp presiding over the Nomenclature Session with fellow Bureau of Nomenclature members Nicholas Turland, John Wiersema, Anna Monro, Yun-fei Deng. Ph. K. Wilson

David Mabberley (Chair) and Karen Wilson (Secretary) of the General Committee for Nomenclature;

Niels Klazenga (Secretary of the Committee for Bryophytes; ex officio member of the General C'tee);

Bill Woelkerling (Chair, C'tee for Algae);

David Cantrill (member, C'tee for Fossils);

Peter Wilson (member, C'tee for Vascular Plants);

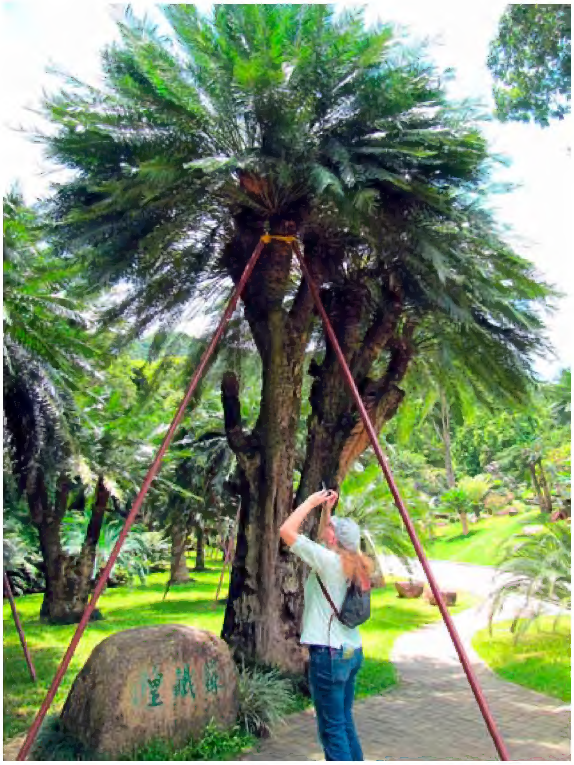
Anna Monro (member, Editorial C'tee);

Pina Milne (member, new C'tee on Institutional Votes);

Ilse Breitwieser and Shelley James (members, new Registration C'tee).

After a very full but successful week, all Nomenclature participants were happy to finish at 5 p.m. on the Friday, leaving us free to sightsee and relax for a day or two. Some of us went to the Fairy Lake Botanical Garden (Fig. 5), which is on the eastern edge of the city (c. 25 km from downtown), and well worth visiting. The Garden is partly natural tropical forest but with specialist plantings spread around its 546 mountainous hectares.

Fig. 5. Tanja Schuster under a Cycas plant, Fairy Lake Botanical Garden. Ph. K. Wilson



IBC 2017
XIX International Botanical Congress
第19届国际植物学大会
Shenzhen China 7月23-29日

Fig. Cyperologists gather at the green wall at the entrance to the Congress Centre, including Jeremy Bruhl, Russell Barrett and Karen Wilson. Ph. Martin Lechowicz

The national cycad collection is there, for example, and a 'petrified forest' of fossilised tree trunks stands next to a dinosaur museum.

Registration for the IBC was spread over the weekend because of the high numbers and ended with the IBC welcome reception on the Sunday evening: a spectacular show of Chinese music, dancing and acrobatics.

The main proceedings

The main Congress was held 23–29 July in the enormous Convention and Exhibition Centre adjacent to the city centre. Big as it was, with up to 28 parallel sessions each afternoon, some sessions had to be held in a hotel a few blocks away. The symposia covered the usual broad range of topics and (also as usual) one often found talks of particular interest being presented at the same time. Vicki Funk describes activities (Funk 2017) and I won't repeat all that she wrote – this and the other references below are all freely accessible in Taxon on the Ingenta site (Web ref.). One of Vicki's favourite features (and mine) was a spectacular green wall at the top of the long flight of stairs at the entrance, and several other green walls made and sponsored by a local company.

The final plenary session included two major awards. The Engler Medal in Gold for plant systematics research, awarded by the International Association for Plant Taxonomy at each IBC, went to the eminent Chinese botanist Prof. Hong De-yuan. The Chinese announced a Shenzhen International Award in Plant Sciences. The inaugural award of this went to Dr Peter Raven, who gave his usual inspiring speech about the need for conservation and research to guide it.

The venue for the XX IBC is Rio de Janeiro in July 2023; so start saving your pennies and learning the salsa.

References

Knapp S, Turland NJ, and Zhang Li (2017) Shenzhen Nomenclature Section. *Taxon* 66: 1260–1261. *https://doi.org/10.12705/665.33*

Funk, V. (2017) XIX International Botanical Congress. *Taxon* 66: 1257–1259. *www.iapt-taxon.org/files/Plant_Systematics_World.pdf*

Turland NJ, Wiersema JH, Monro AM, Deng Y-F, and Zhang L (2017) XIX International Botanical Congress: Report of Congress action on nomenclatural proposals. *Taxon* 66: 1234–1235. *https://doi.org/10.12705/665.16*

Web ref. *www.ingentaconnect.com/content/iapt/*